REMARKS

Claims 1-44 are pending in the present application. No claim amendments are made by this Response. Reconsideration of the claims is respectfully requested.

Amendments were made to the specification to update the information for the cross-referenced co-pending patent applications, now issued patents. No new matter has been added by any of the amendments to the specification.

I. Telephone Interview

Applicant thanks Examiner Kasenge and Primary Examiner Palidini for the courtesies extended to Applicant's representative during the June 10, 2003 telephone interview. During the interview, Examiner's Kasenge and Palidini agreed that all of the rejections set forth in the March 11, 2003 Office Action should be withdrawn. However, the Examiners requested that Applicant's representative summarize the arguments presented during the telephone interview in this Response. Thus, the arguments presented during the telephone interview are summarized in the following remarks.

II. 35 U.S.C. § 103, Obviousness, Claims 1-3, 9, 10, 19, 20, 21-23, 29, and 30

The Office Action rejects claims 1-3, 9, 10, 19, 20, 21-23, 29, and 30 under 35 U.S.C. § 103(a) as being unpatentable over Bohrer (U.S. Patent No. 4,478,076) in view of Kenyon (U.S. Patent 5,477,701) and Wu (U.S. Patent 5,850,324). This rejection is respectfully traversed.

As to claims 1-3, 9, 10, 19, 20, 21-23, 29, and 30, the Office Action states:

> Bohrer discloses a method and apparatus of characterizing dielectric material (col. 3, lines 39-48) comprising: using a probe to measure heat flow through the probe (col. 4, lines 14-18) and controlling a heat flow through the probe to be substantially zero (col. 5, lines 16-20). Bohrer discloses the method further comprising: cooling a sensor to a temperature below ambient temperature (col. 4, lines 50-59); and applying a current to the magnetic head to warm the surface of the magnetic head until the heat flow through the probe to is substantially zero (col. 4, lines 35-49). It is inherent in a temperature-measuring probe to comprise of a

> probe body, probe tip, and have temperature sensors at the probe tip. Bohrer does not expressly disclose calculating a thermal conductance of a dielectric material although he does mention the effects of thermal conductivity. Kenyon discloses calculating a thermal conductance of a dielectric material, which includes determining the thermal conductance based on the current, an ambient temperature, and a temperature of the magnetic head (col. 11, lines 45-61). Wu discloses a magnetic head containing dielectric material (col. 5, lines 18-30).
>
> At the time the invention was made, it would have been obvious to use Bohrer's method of characterizing dielectric material with Kenyon's step of calculating a thermal conductance of dielectric material in a magnetic head. One of ordinary skill in the art would have been motivated to do this since Bohrer and Kenyon use their methods to characterize dielectric material and Wu discloses a magnetic head having dielectric material.

Office Action dated March 11, 2003, pages 2-3.

Claim 1, which is representative of the other rejected independent claim 21 with regard to similarly recited subject matter, reads as follows:

> 1. A method of characterizing dielectric material in a magnetic head, comprising:
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> using a probe to measure heat flow through the probe;
>
> controlling a heat flow through the probe to be substantially zero; and
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> calculating a thermal conductance of dielectric material in the magnetic head. (emphasis added)

Neither Bohrer, Kenyon nor Wu, either alone or in combination, teach or suggest the features of claim 1 emphasized above. Furthermore, there is no teaching or suggestion regarding combining Bohrer, Kenyon and Wu in the manner alleged by the Office Action. Moreover, any motivation for combining these references is based solely on a prior knowledge of Applicant's claimed invention, thereby constituting impermissible hindsight reconstruction using Applicant's own disclosure as a guide.

Bohrer is directed to a flow sensor apparatus that is used to measure the air velocity or flow (column 1, lines 6-7). With the flow sensor of Bohrer, two sensing resistors 22 and 24 are placed near a heater resistor 26. The heater resistor 26 is operated at 200 degrees Centigrade above ambient (column 4, lines 20-34). With zero air flow velocity, the heater resistor 26 heats the sensing resistors 22 and 24 to an average

temperature of 170 degrees Centigrade (column 4, lines 38-42). Also, at zero air flow, the difference between the resistances of the resistors 22 and 24 is zero.

With air flow present, the upstream sensing resistor 22 is cooled by the transportation of heat away from the sensor 22 toward heater resistor 26. The downstream sensor 24 is heated by transportation of heat toward the sensor 24 from the heater resistor 26. Consequently, a resistance difference between sensor resistances 22 and 24 will be present with a corresponding difference in voltage drop which is a measure of the air flow (column 4, lines 50-60).

Bohrer does not teach or suggest a method for characterizing dielectric material in a magnetic head. Bohrer teaches an air flow sensor that is used for determining the velocity of the air flow. Bohrer makes no mention of characterizing dielectric material in a magnetic head and does not teach or suggest how the air flow sensor of Bohrer could be modified such that it could be used for characterizing dielectric material in a magnetic head. Moreover, the Bohrer air flow sensor cannot simply be applied to a magnetic head and have it suddenly be able to characterize the dielectric material in the magnetic head. In short, the air flow sensor of Bohrer is directed to a completely different sensing methodology from that recited in claim 1 and has nothing to do with characterizing dielectric material in a magnetic head.

The Office Action alleges that Bohrer teaches a method and apparatus of characterizing dielectric material at column 3, lines 39-48 which reads as follows:

> The sensor and heater grids are encapsulated in a thin film of dielectric, typically comprising layers 28 and 29 and preferably silicon nitride, to form thin film members. In the embodiment shown in FIGS. 1 and 2, the sensor comprises tow thin film members 32 and 34, member 32 comprising sensor 22 and member 34 comprising sensor 24, each member comprising one-half of heater 26 and having a preferred dimension of 150 microns wide and 400 microns long.

While this section of Bohrer does mention a dielectric, the dielectric mentioned is merely a thin film that encapsulates the sensor and heater grids. The sensor of Bohrer is not used to characterize this dielectric material, this dielectric material is part of the sensor. Moreover, this dielectric mentioned in Bohrer is not a dielectric material of a

magnetic head. The dielectric mentioned in Bohrer is merely an insulator for the sensor and heater grids.

In addition to Bohrer not being directed to the same field as the present invention, Bohrer does not teach or suggest "controlling a heat flow through the probe to be substantially zero" as recited in claim 1. Bohrer relies on heat flow in order to be able to determine the velocity of the air flow through the sensor. If there is no heat flow in the Bohrer sensor, then the air flow is determined to have a velocity of zero. Thus, if Bohrer were made to control the heat flow such that the heat flow is substantially zero, then the Bohrer sensing resistors 22 and 24 would always indicate the air flow velocity to be zero.

Furthermore, even though Bohrer indicates that other arrangements of the sensor may be used including a constant temperature mode (column 4, lines 63-68), this is not the same as maintaining the heat flow through the probe to be substantially zero. To the contrary, even in a constant temperature arrangement of the sensor of Bohrer, the air flow within the sensor still creates a heat flow, otherwise it would not be possible to measure the velocity of the air flow (the very purpose of the Bohrer sensor). Thus, Bohrer, in all embodiments, requires a heat flow through the sensor in order for the Bohrer sensor to operate as intended.

The Office Action alleges that Bohrer teaches controlling a heat flow through the probe to be substantially zero at column 5, lines 16-20 which read as follows:

> Circuits for accomplishing these functions are illustrated in FIGS. 4 and 5. The circuit in FIG. 4 controls the temperature of heater 26 while the circuit in FIG. 5 provides an output voltage that is proportional to the resistance difference between heat sensing resistors 22 and 24.

While this section of Bohrer describes control circuits, these control circuits are not used to control the heat flow through the probe so that it is substantially zero. Rather, all this section of Bohrer teaches is that the control circuits may be used to control the temperature of the heater 26 and provide an output voltage proportional to the resistance difference between the heat sensing resistors 22 and 24. There is no teaching or suggestion in this or any other section of Bohrer regarding the controlling of heat flow through a probe so that it is substantially zero.

Moreover, Bohrer does not teach or suggest "calculating a thermal conductance of dielectric material in the magnetic head" as recited in claim 1. The Office Action admits that Bohrer does not teach this feature (see page 2 of the Office Action). Bohrer does not teach this feature partly because Bohrer is not directed to a method of characterizing a dielectric material in a magnetic head. Again, Bohrer is directed to an air flow velocity sensor. Bohrer has nothing to do with characterizing dielectric materials, let alone a dielectric material in a magnetic head.

The Office Action alleges that Kenyon teaches calculating a thermal conductance of a dielectric material at column 11, lines 45-61. Kenyon is directed to a mass flow control apparatus and method for a working fluid. As with Bohrer, Kenyon has nothing to do with characterizing the dielectric material in a magnetic head.

Moreover, column 11, lines 45-61 of Kenyon discuss calculating "the thermal conductance between the thermistor and the refrigerant" rather than calculating the thermistor resistance, as with the previously described embodiments in the Kenyon reference. Thus, Kenyon teaches calculating the thermal conductance between a thermistor and a refrigerant, not the thermal conductance of dielectric material in a magnetic head. This is because Kenyon is not directed to a method of characterizing dielectric material in a magnetic head but is instead directed to an apparatus and method for mass flow control of a working fluid in a refrigeration system. In addition, Kenyon does not teach or suggest the other features deficient in Bohrer discussed above.

The Wu reference is cited as allegedly teaching a magnetic head containing a dielectric material. While Wu does teach dielectric isolators 100 and 125 for isolating conductor leads 70, there is no teaching or suggestion in Wu to use a method such as that recited in claim 1 to characterize the dielectric isolators. That is, there is no teaching or suggestion in Wu to use a probe to measure heat flow through the probe, control a heat flow through the probe to be substantially zero, and calculating a thermal conductance of dielectric material in the magnetic head.

Moreover, there is no teaching or suggestion in Bohrer to use the air flow velocity sensor to characterize the dielectric isolators of Wu. There is no teaching or suggestion in Kenyon to calculate the thermal conductance of the dielectric isolators of Wu. In short, there is no teaching or suggestion in any of the references with regard to the

desirability, or even possibility, of combining the teachings of any one of these references with any one of the other references, let alone the combination of all three references alleged by the Office Action. The only suggestion to combine these references in the manner alleged by the Office Action is rooted in a prior knowledge of Applicant's claimed invention. That is, the only reason anyone would attempt to combine these references would be with the prior goal of attempting to arrive at Applicant's claimed invention and thus, a prior knowledge of Applicant's claimed invention is necessary. This is impermissible hindsight reconstruction using Applicant's own disclosure as a guide and cannot be used as a basis for rejecting the pending claims.

In addition, even if one were somehow motivated to combine these references, it would not be possible to combine them to arrive at Applicant's claimed invention. As mentioned above, Bohrer is directed to an air flow velocity sensor. Kenyon is directed to a mass flow control apparatus and method for a refrigeration system, and Wu merely teaches a magnetic head having dielectric isolators. It is not at all clear to those of ordinary skill in the art how one could combine an air flow velocity sensor with a mass flow control apparatus for a refrigeration system and a magnetic head. These are non-analogous references that cannot be combined. Even if one attempted to combine them, the result would be some mish-mash of an air flow velocity sensor with a mass flow control apparatus for a refrigeration system having a magnetic head with dielectric isolators. The result would not be Applicant's claimed invention.

Similar distinctions over the alleged combination of references apply to independent claim 21 as well. Claim 21 recites a probe for measuring heat flow through the probe, means for controlling heat flow through the probe to be substantially zero, and means for calculating a thermal conductance of dielectric material in the magnetic head, and thus, has similar features to claim 1.

In view of the above, Applicants respectfully submit that neither Bohrer, Kenyon nor Wu, either alone or in combination, teach or suggest the features of independent claims 1 and 21. At least by virtue of their dependency on claims 1 and 21, respectively, neither Bohrer, Kenyon nor Wu, either alone or in combination, teach or suggest the

features of dependent claims 2-3, 9, 10, 22-23, 29 and 30.[1] Accordingly, Applicants respectfully request withdrawal of the rejection of claims 1-3, 9, 10, 19, 20, 21-23, 29 and 30 under 35 U.S.C. § 103(a).

In addition to the above, neither Bohrer, Kenyon nor Wu, either alone or in combination, teach or suggest the specific features recited in dependent claims 2-3, 9, 10, 19, 20, 22-23, 29 and 30. For example, with regard to claims 2 and 22, none of these references teach or suggest cooling a magnetic head to a temperature below ambient temperature and applying a current to the magnetic head to warm the surface of the magnetic head until the heat flow through the probe is substantially zero. The Office Action alleges that these features are taught at column 4, lines 35-59 of Bohrer which reads as follows:

> In the preferred embodiment at zero air flow velocity, thermal conduction form heater resistor grid 26, largely through the surrounding air space including air space 30, heats identical temperature sensing resistor grids 22 and 24 to an average temperature of about 140 degrees Centigrade or about 70 percent of the temperature elevation of heater element 26. In the preferred embodiment illustrated, sensor grids 22 and 24 are precisely symmetrically located with respect to heater grid 26 so that at zero air flow they have identical temperatures and have no differences between their resistances. Consequently, a small probe current, o.1 to 1.0 milliamperes preferred, through both sensor resistances 22 and 24 will develop no voltage difference at zero air flow velocity.
>
> With air flow present, upstream resistor sensor 22 will be cooled by the transportation of heat away from sensor 22 toward heater resistor grid 26, whereas downstream sensor 24 will be heated by transportation of heat toward the sensor from heat resistor grid 26. Consequently, a resistance difference between sensor resistances 22 and 24 will be present with a corresponding difference in voltage drop which is a measure of the air flow. Typical unamplified voltage differences can be as high as 0.1 volt at a 1500 feet per minute flow velocity.

There is no mention of a magnetic head, no mention of cooling a magnetic head to below an ambient temperature, or applying a current to a magnetic head to warm the surface of the magnetic head until the heat flow through the probe is substantially zero.

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[1] It should be noted that claims 19 and 20 are actually dependent on claim 11 which is rejected based on a different combination of references addressed hereafter. However, the features specifically recited in claim 19 will be addressed along with similar features in claims 9, 10, 29 and 30.

There is no mention of a magnetic head because Bohrer teaches an air flow velocity sensor, not a method of characterizing dielectric material in a magnetic head.

In addition, Bohrer specifically states that the heater resistor grid 26 and the sensing resistors 22 and 24 operate above the ambient temperature (200 degrees and approximately 140 degrees Centigrade). The cooling obtained from the air flow does not make this temperature drop to below ambient. And even if it did, this still is not the cooling of a magnetic head.

Moreover, while Bohrer mentions "a small probe current", this current is not applied to a magnetic head. The "small probe current" is applied to sensor resistors 22 and 24. There is no teaching or suggestion to apply a current to a magnetic head to warm the surface of the magnetic head until the heat flow through the probe is substantially zero.

With regard to claims 3 and 23, none of the cited references teach or suggest that the thermal conductance of a dielectric material in a magnetic head is determined based on the current applied to the magnetic head, an ambient temperature and a temperature of the magnetic head. The Office Action alleges that this feature is taught by Kenyon at column 11, lines 45-61. While Kenyon teaches that the terminal conductance of a thermistor 150 may be calculated as the ration of power dissipated in the sensor divided by the difference between a sensor temperature and a refrigerant temperature, this is not the same as the feature recited in claims 3 and 23. Nowhere in Kenyon is it taught or suggested to calculate the thermal conductance of a <u>dielectric material</u> in a <u>magnetic head</u> based on a current <u>applied to the magnetic head</u>, an <u>ambient temperature</u> and a <u>temperature of the magnetic head</u>. To the contrary, Kenyon uses <u>power dissipated by a sensor</u>, temperature of <u>a sensor</u>, and temperature of <u>a refrigerant</u> to obtain the thermal conductance of <u>a thermistor</u>.

Regarding claims 9, 10, 19, 20, 29 and 30, none of the references teach a probe having a first temperature sensor positioned at a tip of a probe tip formed on a probe body and a second temperature sensor positioned at a base of the probe tip. The Office Action alleges, with regard to the Bohrer reference, that such features are "inherent" in a temperature measuring probe. However, Bohrer does not teach or suggest a probe body having a probe tip and sensors at the tip and base of the probe tip. Bohrer teaches a flat

probe across which air is allowed to flow. It is not at all "inherent" in Bohrer to have a probe tip or sensors at the tip and base of the probe tip. Therefore, it is also not "inherent" to use a sensor at a tip of a probe tip and a base of a probe tip to measures heat flow through the probe, as recited in claims 10 and 30.

Thus, in addition to being dependent on their respective independent claims and being allowable over the cited reasons by virtue of their dependency, claims 2-3, 9, 10, 19, 20, 22-23, 29 and 30 are also allowable over the alleged combination of references based on the specific features recited therein.

III. 35 U.S.C. § 103, Alleged Obviousness, Claims 4, 5, 24, and 25

The Office Action rejects claims 4, 5, 24, and 25 under 35 U.S.C. § 103(a) as being unpatentable over Bohrer, Kenyon, and Wu as applied to claim 1 and 22 above, and further in view of Iijima (U.S. Patent 5,966,275). This rejection is respectfully traversed.

This rejection is based on the erroneous interpretation of the Bohrer, Kenyon and Wu references discussed above and thus, suffers the deficiencies previously addressed. The Iijima reference is cited for teaching a giant magentoresistive sensor. While Iijima does teach a giant magnetoresistive (GMR) magnetic sensor, Iijima does not provide for the deficiencies discussed above with regard to Bohrer, Kenyon and Wu. That is Iijima does not teach or suggest controlling a heat flow through the probe to be substantially zero and calculating a thermal conductance of dielectric material in the magnetic head.

Moreover, there is no teaching or suggestion in any of the references as to the desirability or even possibility of combining the teachings of these four references in the manner alleged by the Office Action. As discussed above, it is not at all clear how one of ordinary skill in the art would be motivated to combine an air flow velocity sensor (Bohrer) with a mass flow control system for a refrigeration system (Kenyon) and a magnetic head. Furthermore, it is not at all clear how one of ordinary skill in the art would be motivated to combine a GMR magnetic sensor (Iijima) with these other unrelated references. The only reason one might try to combine these references as the Office Action alleges, is in order to attempt to recreate Applicant's claimed invention, having first had benefit of Applicant's disclosure. However, even if one were motivated

to make such a combination, which is highly unlikely, the result still would not be the invention recited in independent claims 1 and 21 from which claims 4, 5, 24 and 25 depend.

In addition, claims 4, 5, 24 and 25 recite specific features that are not taught or suggested by the alleged combination of references. Claims 4 and 24 recite that the current is applied to the giant magnetoresistive sensor. There is no teaching or suggestion in any of the references to apply a current to a giant magnetoresistive sensor to warm the surface of a magnetic head until the heat flow through the probe is substantially zero. Claims 5 and 25 recite an equation for calculating thermal conductance that includes the resistance of a giant magnetoresistive sensor, an ambient temperature, and a temperature of a magnetic head. None of the references teach or suggest such an equation.

Thus, in view of the above, neither Bohrer, Kenyon, Wu nor Iijima, either alone or in combination, teach or suggest the features of dependent claims 4, 5, 24 and 25. Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 4, 5, 24, and 25 under 35 U.S.C. § 103(a).

IV. <u>35 U.S.C. § 103, Alleged Obviousness, Claims 6 and 26</u>

The Office Action rejects claims 6 and 26 under 35 U.S.C. § 103(a) as being unpatentable over Bohrer, Kenyon, and Wu as applied to claims 2 and 22 above, and further in view of Chow (U.S. Patent 4,405,961). This rejection is respectfully traversed.

This rejection is based on the erroneous interpretation of the Bohrer, Kenyon and Wu references discussed above and thus, suffers the deficiencies previously addressed. The Chow reference is cited as teaching a thermoelectric cooler for magnetic heads. While Chow does teach a thermoelectric cooling module for a magnetic head assembly, the thermoelectric cooling module of Chow does not cool magnetic shields in the magnetic head. To the contrary, Chow explicitly states that the thermoelectric cooling element 28 is seated in a rectangular slot 30 formed in the housing wall 28 adjacent to the read module 10 (see Figures 1 and 2 of Chow). The thermoelectric cooling element

transfers heat energy from the head module assembly to the slotted housing wall (column 2, lines 35-38).

The thermoelectric cooling element of Chow does not cool magnetic shields in the magnetic head. Thus, even if it were possible, and one of ordinary skill in the art were somehow motivated to combine Chow with the other unrelated references in the manner alleged, the result still would not be the invention as recited in claims 6 and 26 since none of the references teach or suggest a thermoelectric cooler that cools magnetic shields in a magnetic head.

In view of the above, Applicant respectfully submits that neither Bohrer, Kenyon, Wu nor Chow, either alone or in combination, teach or suggest the features of claims 6 and 26. Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 6 and 26 under 35 U.S.C. § 103(a).

V. <u>35 U.S.C. § 103, Alleged Obviousness, Claims 7, 8, 27, and 28</u>

The Office Action rejects claims 7, 8, 27, and 28 under 35 U.S.C. § 103(a) as being unpatentable over Bohrer, Kenyon, Wu, and Chow as applied above, and further in view of Watanabe (U.S. Patent 5,409,547). This rejection is respectfully traversed.

This rejection is traversed at least for the same reasons as set forth above with regard to claims 1 and 21 above. Furthermore, neither Chow nor Watanabe provide for the deficiencies of Bohrer, Kenyon and Wu as discussed in the response to the rejection of claims 1 and 21 above.

In addition, none of these references teach or suggest modeling thermoelectric characteristics of a magnetic head based on a calculated thermal conductance (claims 7 and 27) or controlling cooling of a magnetic head during operation based on the modeling of thermoelectric characteristics of the magnetic head (claims 8 and 28). The Office Action alleges that these features are taught by Watanabe at column 4, lines 46-68 and column 18, lines 21-26 which read as follows:

> In a second aspect of the present invention, there is also provided a thermoelectric cooling device of a similar construction to the thermoelectric cooling device according to the first aspect of the present invention,

> wherein said p-type semiconductor layers and n-type semiconductor layers have an average thickness (t) smaller than 0.08 cm, but greater than 0 cm and the average figures of merit (Z) of said p-type semiconductor layers and n-type semiconductor layers are controlled at least 3.0×10^{-3}/K or above, the thermal conductance (Kcp) of said first inner heat conductor within a range of 8-20 W/°C cm^2 of the cross-sectional area of both the p-type and n-type semiconductor layers, the thermal conductance (Kc) of said first outer heat conductor within a range of 7-10 W/°C cm^2 of the corss-section area of both the p-type and the n-type semiconductor layers, the thermal conductance (KHP) of said second inner heat conductor within a range of 8-20 W/°C cm^2 of the cross-sectional area of both the p-type and n-type semiconductor layers, and the thennal conductance (KH) of said second outer heat conductor within a range of 7-10 W/°C cm^2
>
> (column 4, lines 46-68 of Watanabe)

> The press 45 and the sintering power supply 48 are connected to a control unit 49 which governs the pressure and pulsated current to be applied to the sintering powder mix 42. This control unit 49 is in turn connected to position sensors 50, an atmosphere control system 51, a water-cooling system 52, temperature sensors 53, etc.
>
> (column 18, lines 21-26 of Watanabe)

Neither of these sections, nor any other section, of Watanabe even mention modeling thermoelectric characteristics of a magnetic head based on a calculated thermal conductance or controlling cooling of a magnetic head during operation based on the modeling of thermoelectric characteristics of the magnetic head. While these sections mention "thermal conductance" and "controlling", the "thermal conductance" and "controlling" has nothing to do with the present invention. To the contrary, the thermal conductance and control described in Watanabe is the thermal conductance of layers of a semiconductor used in fabricating a thermoelectric cooler and the control is the control of the amount of pressure and current applied to a sintering powder mix.

In short, Watanabe is not relevant to the present invention and furthermore, is non-analogous art with regard to the other similarly non-analogous references. One of ordinary skill in the art would not so much as even look at Watanabe, let alone attempt to

combine the semiconductor fabrication method of Watanabe with the air flow sensor of Bohrer, the mass flow control system for a refrigeration system of Kenyon, the magnetic head of Wu, and the thermoelectric cooler of Chow.

In view of the above, Applicant respectfully submits that neither Bohrer, Kenyon, Wu, Chow or Watanabe, either alone or in combination, teach or suggest the features of claims 7, 8, 27 and 28. Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 7, 8, 27, and 28 under 35 U.S.C. § 103(a).

VI. 35 U.S.C. § 103, Alleged Obviousness, Claims 11-18

The Office Action rejects claims 11-18 under 35 U.S.C. § 103(a) as being unpatentable over Bohrer, Kenyon, Wu, Chow, and Watanabe and further in view of Yamamoto (U.S. Patent 6,128,160). This rejection is respectfully traversed.

The deficiencies of the alleged combinations of Bohrer, Kenyon, Wu, Chow and Watanabe have been discussed at length above. Yamamoto does not provide for these deficiencies. Yamamoto is merely cited for teaching a read/write head.

None of the cited references teach or suggest determining a thermal conductance of a read/write head by controlling heat flow through a probe to be substantially zero, modeling thermoelectric properties of the read/write head based on the determined thermal conductance, or controlling thermal operation of the read/write head based on the modeling of the thermoelectric properties. Moreover, the references are all directed to different unrelated fields of technology and cannot be combined in the manner alleged by the Office Action. The Examiner is referred to the discussion of the references provided with regard to the other rejections above for the various reasons why none of the references teach or suggest the features of the present invention. Moreover, dependent claims 12-18 recited similar features to the other dependent claims previously addressed and the Examiner is referred to these previous discussions for the reasons why the dependent claims define over the alleged combination of references.

In view of the above, Applicant respectfully submits that neither Bohrer, Kenyon, Wu, Chow, Watanabe nor Yamamoto, either alone or in combination, teach or suggest

the features of claims 11-18. Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 11-18 under 35 U.S.C. § 103(a).

VII. 35 U.S.C. § 103, Alleged Obviousness, Claims 31-38

The Office Action rejects claims 31-38 under 35 U.S.C. § 103(a) as being unpatentable over Bohrer, Kenyon, Wu, Iijima, and Chow and further in view of Watanabe, (U.S. Patent 5,409,547). This rejection is respectfully traversed for at least the same reasons as set forth above with regard to the similar subject matter in claims 1-8. Thus, Applicant respectfully requests withdrawal of the rejection of claims 31-38 under 35 U.S.C. § 103(a).

VIII. 35 U.S.C. § 103, Alleged Obviousness, Claims 39-44

The Office Action rejects claims 39-44 under 35 U.S.C. § 103 as being unpatentable over Bohrer, Kenyon, Wu, Iijima, Watanabe, and Chow and further in view of Furukawa (U.S. Patent 6,167,095). This rejection is respectfully traversed.

In addition to the many deficiencies of Bohrer, Kenyon, Wu, Iijima, Watanabe and Chow previously discussed, none of these references teach or suggest determining a signal to noise ratio of a GMR sensor of a magnetic head based on the thermal conductance of the dielectric material. The Office Action alleges that this feature is taught by Furukawa but fails to provide any citation of where this teaching is allegedly found in Furukawa.

Furukawa teaches a method and apparatus that provides an improved digital bidirectional communication transceiver system in which the upstream and downstream portions of the frequency spectrum are allocated based on the computed signal quality parameters representative of the line conditions. Furukawa has nothing to do with determining the signal to noise ratio of a GMR sensor of a magnetic head, let alone determining the signal to noise ratio of a GMR sensor based on the thermal conductance of a dielectric material. The Office Action has failed to show where this feature is taught

anywhere in Furukawa or any of the other references and thus, has not established a prima facie case of obviousness with regard to claims 39-44.

In view of the above, Applicant respectfully submits that neither Bohrer, Kenyon, Wu, Iijima, Watanabe, Chow nor Furukawa, either alone or in combination, teach or suggest the features of claims 39-44. Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 39-44 under 35 U.S.C. § 103(a).

IX. Conclusion

It is respectfully urged that the subject application is patentable over Bohrer, Kenyon, Wu, Iijima, Chow, Watanabe, Yamamoto and Furukawa and is now in condition for allowance. The Examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the Examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

Respectfully submitted,

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